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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/585,921	06/02/2000	David Eppes	AMDA.478PA	6312

7590 04/05/2002
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EXAMINER

NGUYEN, JIMMY

ART UNIT PAPER NUMBER

2829

DATE MAILED: 04/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/585,921

Applicant(s)

EPPES ET AL.

Examiner

Jimmy Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-31 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 2, 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Goruganthu et al (US 6281029).

As to claims 1, 8, Goruganthu et al disclose a method for manufacturing and analyzing a semiconductor die including;

Forming a plurality of heating elements (column 6 line 30-33) in the die (12);

While operating the die, selectively controlling the heating elements and therein causing at least one of the heating elements to heat at least one adjacent portion of the die (column 3 line 14-45); and

Analyzing the die via operation (column 4 line 45-49)

As to claim 2, Goruganthu et al disclose the operation of the die includes a test pattern on a portion of the die suspected to cause a failure (run the test pattern on the selected region; column 4)

3. Claims 22-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Birdsley (US 6255124).

As to claims 22 , 23, Birdsley disclose a test system including
Control means for selectively causing at least one of the heating elements (thermal conductive elements) to generate heat and to heat a portion of the die (12) therefrom;

Operating (activated) means for operating the die (12); and

Detection (computer, not shown, column 5 line 52, 53) means for detecting a response from the die (12)

As to claims 24, 30, Birdsley disclose the testing device (computer, not shown, column 5 line 52, 53) and the controller are included in a single testing arrangement

As to claims 25, 26, Birdsley disclose detecting a temperature characteristic related to the heated portion of the die; and in response to the detected temperature characteristic, controlling the heating via a feedback loop,

control register and using temperature sensor (computer not shown, column 5 line 52, 53)

As to claims 27- 29, 31, Birdsley disclose a stage (chuck) to hole the die and electrically couple the die to the testing device (computer not shown, column 5 line 52, 53)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-7, 9-13, 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goruganthu et al (US 6281029) in view of Birdsley (US 6255124).

As to claim 3, Goruganthu et al disclose the method for manufacturing and analyzing a semiconductor die except for the step of operating the die includes electrically coupling the die to a signal generator adapted to supply test signals to the die.

On the other hand, Birdsley teach for the step of operating the die includes electrically coupling the die (202) to a signal generator adapted to supply test signals (not shown) to the die (column 5 line 49-53) for the purpose of analyzing the internal circuitry of the die while activated (column 5 line 52, 53)

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the method of testing a flip chip semiconductor device of Goruganthu et al to use the computer testing device as taught by Birdsley for the purpose of analyzing the internal circuitry of the die while activated (column 5 line 52,53)

As to claim 4, Goruganthu et al disclose detecting that device is malfunctioning (column 2 line 59)

As to claims 5, 6, Goruganthu et al disclose the portion of the die being heated at the time that a malfunction is detected (running at high speed; column 4 line 1-10) and correlating the portion of the die being heated to a critical timing path (high speed running)

As to claim 7, Goruganthu et al disclose the flip chip bonded die (12) and a wire bonded die

As to claims 9, 18, Birdsley disclose (fig 4) electrically coupling the die to a package, wherein selectively controlling the heating elements includes applying an electrical signal to the heating elements via the electrical coupling (connector to the package. (column 5 line 52,53)

As to claims 10, 11, the heating elements cause a portion of the die to heat a selected temperature and selected sequence (within the scope of Goruganthu et al invention)

As to claims 12, 13, 21 Goruganthu et al disclose selectively controlling the heating elements includes causing at least two of the heating elements (claim 2 column 6 line 30, plurality of thermal conductive elements) to generate heat, and wherein the at least two of the heating elements are located sufficiently distant from each other so that the heat from one does not interfere with heat from another one of elements the plurality of heating elements in the die includes grid of heating elements (column 6 line 1-14)

As to claims 15 -17, 19, 20, Birdsley disclose detecting a temperature characteristic related to the heated portion of the die; and in response to the detected temperature characteristic, controlling the heating via a feedback loop, control register and using temperature sensor (computer not shown, column 5 line 52, 53)

Allowable Subject Matter

6. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims because the prior arts of record does not disclose the method of selectively controlling the heating elements comprise the step of grouping the heating elements into selected groups, each group having two or more heating elements;
- causing the selected groups to heat in a response;

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detecting a response from the die that indicates that the die is operating defectively; and

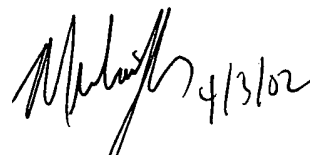
in response to detecting defective operation, identifying the selected group being caused to heat when the response is detected; and

selectively operating individual heating elements of the selected group.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Nguyen at (703) 306-5858. Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4900.

JN.
March 27, 2002


MICHAEL J. SHER
PRIMARY EXAMINER